

What is claimed is:

1. A method for requesting and sending data in a DSL network, the method comprising:

- 5 (a) Generating a request to send and receive data; and
 (b) Embedding the request within a superframe.

2. The invention of claim 1 wherein the request comprises RTS/CTS signals.

3. A method for oversubscribing a DSL modem, the method comprising:

- 10 (a) connecting M DSL modems to a first set of M Customer Premise
Equipment devices;
 (b) connecting P OAM/EOC modems to a first set of P Customer Premise
Equipment devices;
 (c) transferring user traffic data between the M DSL modems and the first set
of M Customer Premise Equipment devices; and
15 (d) transferring synchronization data between the P OAM/EOC modems and
the first set of P Customer Premise Equipment devices.

4. The invention of claim 3 further comprising:

- 20 (e) connecting the M DSL modems to a second set of M Customer Premise
Equipment devices, wherein at least some of the second set of M Customer Premise
Equipment devices are members of the first set of P Customer Premise Equipment
devices;
 (f) connecting the P OAM/EOC modems to a second set of P Customer
Premise Equipment devices wherein at least some of the second set of P Customer
Premise Equipment devices are members of the first set of M Customer Premise
25 Equipment devices;

(g) transferring user traffic data between the M DSL modems and the second set of M Customer Premise Equipment devices; and

(h) transferring synchronization data between the P OAM/EOC modems and the second set of P Customer Premise Equipment devices.

5 5. The invention of claim 4 further comprising determining the first and second sets of M and P Customer Premise Equipment devices at least in part via RTS/CTS signals.

6. The invention of claim 5 further comprising embedding the RTS/CTS signals within superframes.

7. The invention of claim 3 wherein the bandwidth requirements of the synchronization data is less than about 1 percent of that of the user traffic data.

8. The invention of claim 3 further comprising, for each M DSL modem connected to each M Customer Premise Equipment device, stopping the transfer of user traffic data when at least one of the following condition are met: Time-Out, or No-More-Data.

9. A system for oversubscribing a DSL modem, the system connected between at least one upstream data link and a plurality of N downstream data links, each downstream data link coupled to respective Customer Premise Equipment devices, the system comprising:

M DSL modems connected to the at least one upstream data link;

P OAM/EOC modems in communication with said M DSL modems; and

a switch connected to the N downstream data links, said M DSL modems, and said P OAM/EOC modems.

10. The invention of claim 9 further comprising means for communicating RTS/CTS signals between the respective Customer Premise Equipment devices and said M DSL modem and said P OAM/EOC modems.

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11. A system for oversubscribing a DSL modem, the system connected between at least one upstream data links and a plurality of N downstream data links, the system comprising:

- an M:N analog multiplexer connected to the N downstream data links;
- a P:N analog multiplexer connected to the N downstream data links;
- a DSL DSP path comprising:
 - M DSL DSPs connected to the at least one upstream data link;
 - M High Frequency Digitizers in communication with said M DSL DSPs;
 - M 2to4 Hybrids with Line Drivers in communication with said M High Frequency Digitizers; and
 - M Isolation Circuitry in communication with said M 2to4 Hybrids with Line Drivers and with said M:N analog multiplexer;
- an OAM/EOC DSP path comprising:
 - P OAM/EOC DSPs;
 - P Low Frequency Digitizers in communication with said P OAM/EOC DSPs;
 - P 2to4 Hybrids with Line Drivers in communication with said P Low Frequency Digitizers; and
 - P Isolation Circuitry in communication with said P 2to4 Hybrids with Line Drivers and with said P:N analog multiplexer.

12. A system for oversubscribing a DSL modem, the system connected between at least one upstream data links and a plurality of N downstream data links, the system comprising:

- an M:N analog multiplexer;
- a P:N analog multiplexer;
- N Isolation Circuitry connected to the N downstream data links and in communication with said M:N analog multiplexer and said P:N analog multiplexer;
- a DSL DSP path comprising:
 - M DSL DSPs connected to the at least one upstream data link;
 - M High Frequency Digitizers in communication with said M DSL DSPs; and

M 2to4 Hybrids with Line Drivers in communication with said M High Frequency Digitizers and with said M:N analog multiplexer.
an OAM/EOC DSP path comprising:

P OAM/EOC DSPs;

5 P Low Frequency Digitizers in communication with said P OAM/EOC DSPs;
and

P 2to4 Hybrids with Line Drivers in communication with said P Low Frequency Digitizers and with said P:N analog multiplexers.

13. A system for oversubscribing a DSL modem, the system connected between at least one upstream data links and a plurality of N downstream data links, the system comprising:

an M:N analog multiplexer;

a P:N analog multiplexer;

N 2to4 Hybrids with Line Drivers in communication with said M:N analog multiplexer and said P:N analog multiplexer;

N Isolation Circuitry connected to the N downstream data links and in communication with said N 2to4 Hybrids with Line Drivers;

a DSL DSP path comprising:

M DSL DSPs connected to the at least one upstream data link; and

20 M High Frequency Digitizers in communication with said M DSL DSPs and
with said M:N analog multiplexer.

an OAM/EOC DSP path comprising:

P OAM/EOC DSPs; and

25 P Low Frequency Digitizers in communication with said P OAM/EOC DSPs
and with said P:N analog multiplexer.

14. A system for oversubscribing a DSL modem, the system connected between at least one upstream data links and a plurality of N downstream data links, the system comprising:

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an M:N digital multiplexer;

a P:N digital multiplexer;

N High Frequency Digitizers in communication with said M:N digital multiplexer and said P:N digital multiplexer;

5 N 2to4 Hybrids with Line Drivers in communication with said N High Frequency Digitizers;

N Isolation Circuitry connected to the N downstream data links and in communication with said N 2to4 Hybrids with Line Drivers;

a DSL DSP path comprising M DSL DSPs connected to the at least one upstream data link and in communication with said M:N digital multiplexer; and

an OAM/EOC DSP path comprising P OAM/EOC DSPs in communication with said P:N digital multiplexer.

15 15. A system for oversubscribing a DSL modem, the system connected between at least one upstream data links and a plurality of N downstream data links, the system comprising:

a Time Division Multiplexed Switch;

N High Frequency Digitizers in communication with said Time Division Multiplexed Switch;

20 N 2to4 Hybrids with Line Drivers in communication with said N High Frequency Digitizers;

N Isolation Circuitry connected to the N downstream data links and in communication with said N 2to4 Hybrids with Line Drivers;

a DSL DSP path comprising M DSL DSPs in communication with said Time Division Multiplexed Switch and connected to the at least one upstream data link; and

25 an OAM/EOC DSP path comprising P OAM/EOC DSPs in communication with said Time Division Multiplexed Switch.

16. The invention of claim 9, 11, 12, 13, 14, or 15 wherein the N downstream data links comprise POTS lines.

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17. The invention of claim 9, 11, 12, 13, 14, or 15 wherein the at least one upstream data link comprises at least one of the following: a POTS line, optical fiber, a twisted pair conductor, the Public Switched Telephone Network, a T1 connection, a T3 connection, an ISDN connection, coaxial cable, an SHDSL link, an ADSL link, a VDSL link, an HDSL link, a V.90 link, and an OCn link.

18. The invention of claim 9, 11, 12, 13, 14, or 15 wherein $M+P=N$, and wherein P is at least 1.

19. In a system comprising a plurality of Customer Premise Equipment devices, a method for oversubscribing a DSL modem, the method comprising:

(a) according to the priority and order of a request from each Customer Premise Equipment device, connecting each Customer Premise Equipment device to a DSL Modem or an OAM/EOC Modem;

(b) for each Customer Premise Equipment device, if connected to a DSL Modem, transferring user traffic data, otherwise if connected to an OAM/EOC Modem, transferring synchronization data;

(c) for each Customer Premise Equipment device connected to a DSL Modem, determining if a Time-Out or a No-More-Data condition exists; and

(d) if a Time-Out or No-More-Data condition exists as determined in (c) repeating steps (a)-(d), otherwise repeating steps (b)-(d).

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